

Francis (J. W.)

PROFESSOR FRANCIS'
D I S C O U R S E
ON
NATURAL HISTORY.

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DISCOURSE
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A

DISCOURSE:

DELIVERED UPON THE OPENING OF THE

NEW HALL

OF THE

NEW-YORK LYCEUM

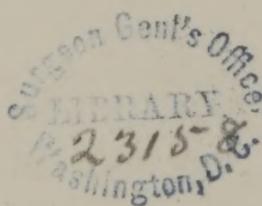
OF

NATURAL HISTORY.

BY

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IN THE UNIVERSITY OF THE STATE OF NEW-YORK, ETC.



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M DCCC XLI.

N O T I C E .

THE partial estimate of the following Discourse, by a few friends, not altogether unversant in Natural History, has led to its present appearance before the public. The occasion and circumstances which called it forth prevented a more extensive exposition of the ample theme to which it relates. An evening's exercise was little fitted to develope matters, the outlines of which might more appropriately fill a volume. Nor did the address delivered, or now printed, contain all that was originally prepared: what is submitted, being merely a general and hasty view of the objects to which the scientific Institution, by whose request it was written, are devoted.

J. W. F.

DISCOURSE, &c.

RESPECTED AUDITORS:

I HAVE no language adequately to express to you the sensations which influence me on this occasion. Properly to address an assembly like the present, composed of the enlightened and refined in the elegancies of literature and taste, among whom are numerous individuals eminent in the several liberal professions, and many who have signalized themselves by their studies and investigations in the philosophy of mind and matter, challenges of the speaker an acquaintance with the extensive fields of natural knowledge, which it would be supererogation in me to attempt for a moment to assume. To become a proficient in the study of the works of nature, constituting a science of the accumulated wisdom of ages, and commanding consideration equally by its profundity and its comprehensiveness, demands the union of pursuits, and feelings, and capabilities, which are rarely allowed to those who conscientiously exercise the responsible art of healing, however ardent may be their love of knowledge, and however exalted their

admiration of the harmonies of the creation. While, therefore, I deem my appointment to the present honour an unequivocal demonstration of your generous disposition towards me, I shall endeavour to discharge the trust with what ability I may; and if, because of the poverty of my attainments, I do not appear before you in the plenary attire of a high priest of the science, your benevolence will tolerate my approach as a conscientious and humble worshipper at the shrine of the temple.

This day marks another epoch in the historical occurrences of New-York. The 28th of December, 1836, is signalized by unfolding the portals of a new Temple of Science for the cultivators of natural knowledge, by the establishment of this Hall of the Lyceum of Natural History. A city long recognized as conspicuous by her various literary and scientific institutions, and prodigal in her numerous benevolent and humane associations, again adds to our admiration of the worth and virtues of her citizens by the spacious and commanding edifice in which we are at this time convened. May the impulse which so signal an occasion creates awaken the members of this society, however laudable their previous efforts, to an enlarged zeal in furtherance of the objects of their organization; and let us hope that at no remote period the trophy of scientific renown may be sustained by this metropolis with no less an undisputed sway, than that with which she now bears the insignia of her distinction as the *punctum saliens* of internal improve-

ment and commercial enterprise in the new world. Henceforth let it be our just pride and emulation to render suitable offerings for the bounties we have received from our disinterested patrons ; let us be emulous of that distinction, which the proper cultivation of the natural sciences bestows on all who, with suitable devotion, investigate the mysteries of the earth and animated nature, and study, with a pure enthusiasm, the vast and innumerable subjects which a Divine intelligence has placed within the contemplation of our powers. Let us, in the grandeur and sublimity of our pursuits remember while we enter upon the several topics of inquiry, how extensive and momentous each may be rendered to the immediate interests of man, and how subservient they all intrinsically are, in strengthening and elevating the human mind to a proper estimate of its own exalted attributes and ultimate destiny.

The Institution, by the authority of which we are at present assembled, has been for many years past, familiarly known as the *New-York Lyceum of Natural History*. The appellation of Lyceum was chosen by its original founders, not without due consideration. Consecrated as that name long ago had been by the school which Aristotle founded, and in which the peripatetics discoursed, it has been for ages appropriated to places where the sciences are unfolded, and physical truth sought by evidence and demonstration. Thus we find, that when the Athenians had at length become fatigued with the ideal and subtle dis-

quisitions at the academy of Plato, that the Lyceum of the Stagirite enkindled new desires of improvement, the better to comprehend the mysteries of things by interrogating Nature herself. Natural History then assumed the dignity of a series of physical and anatomical facts, and the philosophy of organization was built upon those deep and broad principles on which all solid knowledge must ultimately rest. Without, therefore, attempting to appropriate to Aristotle the sole honour of being the father of the only sure method of philosophizing, of deducing general principles from facts and well-wrought experiments, we may nevertheless admit, that this penetrating genius and wonderful man, in *his* practical positions, like Hippocrates in the medical art, pursued, in no limited degree the inductive theory which subsequently immortalized Lord Bacon. I think we are warranted in this conclusion by an examination of the physical writings of Aristotle, particularly of that portion devoted to the history of animals. Natural History with him, was not merely a subject of observation, but a science subjected to the rules of philosophical reasoning, by the powers of his elevated mind. Where the like or kindred studies are prosecuted, and for similar ends, to unfold the Eleusinian nature of things, and enlarge the treasures of intellect, it seems judicious to have designated such an association by a name so universally known and appropriate ; and I am happy to add, that in adopting that of the illustrious ancient, my colleagues in this society have neither been

unmindful of the obligations which it imposes, nor idle venerators of the high title they bear.

Philosophers have repeatedly bewildered themselves, in their endeavours to assign some particular era as the precise time when originated their favourite study, or cherished science, or art. But, as relates to Natural History, we can be at no loss to consider man to have been engaged as Nature's historian immediately upon his first occupation, when he came from the hands of his Maker. The earth on which he walked—the vegetables which added to its beauty and its fragrance—the air in which it moved—the waters by which it was surrounded, and their respective inhabitants—all necessarily became objects of his attention, and called into exercise his faculties of observation and reflection. To adopt the language of the eminently celebrated Bishop Horne, “When man was first formed, Creation was his book and God his preceptor. The elements were so many letters, by means of which, when rightly understood and put together, the wisdom, power and goodness of the Great Author became legible to him.” Natural History, therefore, embracing man himself, a being of life, of motion, and of feeling, and the innumerable phenomena of the earth and the several kingdoms of nature, unfolded to his contemplation the richest materials of study, nor would these fail by the instruction which they imparted, to create in his mind ideas of immeasurable grandeur and sublimity. Imperfect as were his acquisitions at this early period, they were suffi-

cient to quicken his feelings by emotions of the purest character : he must have felt how prolific, how wonderful is the creation ; how bountiful her resources ; with what profusion she has distributed the means of sustenance ; how beneficent the scheme of its duration ; how unspeakably good its Author. In short, no sooner had he assumed the full employment of his physical and intellectual faculties, than he laboured to ascertain, with more or less success, the properties of animals, and the virtues of plants, and to discriminate such as were best adapted to his wants, and thus to become acquainted with the power, and wisdom and benevolence of his Creator, through the instrumentality of his works. Therefore has been given to him dominion over the fish of the sea, and over the fowls of the air, and over the cattle of the earth, and over every creeping thing that creepeth on the earth ; and man has been justly pronounced the interpreter of the works of nature. Hence a natural theology is interwoven and inseparably connected with his very being.

To studies involving the consideration of subjects such as those to which I have just alluded, is this Lyceum especially devoted. To the most casual observer it is apparent how important and laudable they are. They constitute the very store-house which supplies the laboratory of man's most available operations ; they embrace the various objects which are connected with his most common wants and enjoyments ; they grasp the useful and the practical. Simultaneously with his birth he becomes dependant

upon nature for his future existence : his means of living and his duration are derived from this source ; and it has justly been observed, before one addition can be made to his accommodation or comfort, he must go to nature for materials, and to a knowledge of nature for the method of using them.

How inadequate, therefore, is any language to express in just terms the value of the inquiries which must engage this Society, when we consider this subject in the various relations of which it is susceptible. Nature as the source of all the sciences ; while she herself furnishes all the means, the powers and the appliances by which they are rendered subservient to the interests of mankind. But I forbear to enlarge : the truth is too palpable, and illustration is superfluous. He who has but a tyro's acquaintance with the elementary principles of natural philosophy and the mechanical arts, will at once perceive the correctness of our observations and the fitness of our conclusions.

I have thus assumed the prerogatives of man in his primitive state ; at that period, when the land had sprung into existence, and the unformed elements, bursting from chaos, were resolving themselves into this beautiful fabric of creation—when he began to breathe, and move among the creatures of the earth. In contemplating these phenomena, the rudiments of all knowledge must have then been developed. Man was not unprovided with the means of discovery. Necessity and curiosity were among the effective

causes of his intellectual and physical prowess ; and though we possess but imperfect records of its regular progression, the indomitable principle implanted in the human being, to know himself and all around him, has daily increased, from the dawning of conjecture to the solid acquisition of that wisdom which points to his high destiny. Volumes indeed might be written detailing the innumerable errors and absurdities which have at different periods retarded him ere he arrived at the glorious results of real instruction and certain truth. Ages of inquiry may have been exhausted in perplexing research ere an additional fact or a new principle was ascertained ; but his march has ever been onward, and his penetrating glance at length darts through all nature, and bears testimony to the vastness of his conceptions and the insatiable grasp of his powers. Compared with the aggregate mass of knowledge now within the scope of his faculties, little, comparatively, may have been the contributions of any individual, or nation, or age. It is utterly impossible that it could have been otherwise ; but the countless succession of labourers in the cause during the revolutions of centuries have given results which must inspire the deepest veneration and gratitude in those who now live in the full fruition of these accumulated results. Let us select, for example, the two branches of human pursuit which seem to have been among the earliest that arrested the attention and excited the deepest regard —Botany and Astronomy. The sacred writings in-

form us of the skill of Solomon: with all due deference, it was, however, but the germ of vegetable science. Yet have investigations been prosecuted in this department with such solicitude, that we are at present able to enumerate more than one hundred thousand species of plants, and have invoked the aid of a Linnæus and a Jussieu to dispose and classify them. The Chaldean shepherds, while reposing under a cloudless sky, observed the starry firmament. By what other people of antiquity the cultivation of this exalted study was deemed a business, we are precluded from knowing; but this humble beginning of astronomy has resulted in the discovery of new worlds—given birth to the comprehensive and sublime speculations of a Kepler, a Newton, and a La Place, and enrolled our Bowditch among the names imperishable in philosophy.—All are but parts of one stupendous whole.

To select a theme becoming the present interesting occasion has not been without its difficulties. Nothing, perhaps, would be so appropriate as an exposition of the present state of natural science abroad, embracing a cursory view of the early condition of physical knowledge by its primary cultivators, and an examination of the present respective merits of the nations of Great Britain and the European continent. To present but a concise summary of this character, calls for richer materials than I possess; and justly executed, would trespass on time which we have not at command. The inevitable consequence of a mere outline of such a survey, however,

if impartially and judiciously drawn, could not fail to strengthen our admiration of the dignity and importance of natural knowledge as connected with the interests of human society, and raise our estimate of the talents which have been appropriated to its elucidation. It would liberalize our feelings, warm our charities, and counteract the prejudices which unfortunately too often beset even the most enlightened cosmopolite philosopher.

In instituting a comparison of the respective theories of the earth, we would be bound to reduce the speculations of geologists to the actual condition of the globe: and whether we enlisted as disciples of Neptune or of Vulcan, of the Wernerian or of the Huttonian school, while scrutinizing the services of the ingenious writers who have appeared on the subject, with all the lights of modern science, we should be brought to the conclusion of the extraordinary conformity of facts, the most recent and abundant, to the cosmogony of the great Jewish lawgiver. In descanting on another almost boundless topic, zoology, we should be struck with the wonderful sagacity and matchless acumen of Aristotle, the first classifier of this department of physical study. We should be taught the great excellence to which, as a branch of knowledge, it has attained in our own day; and in the exposition of zoological systems, we should be compelled to notice the progress of discovery and the consequent modifications of systematic reasoning.

A discussion, not without practical instruction, would here very properly offer itself.

The arrangement of the several branches of this division of natural history has vexed minds the strongest for accurate discrimination, and, by consequence, the cogitative powers have been subjected to a logic as astute as any the schoolmen may have formed. The Linnæan division, *mammalia*, among the *primates*, it is familiarly known, associates man with the monkey and the bat—a classification not over flattering to the lord of the creation. The fancied chain of being on which poets and philosophers have written so ingeniously; which has occasioned the association of minerals with vegetables, vegetables with animals, and again animals with the Creator, has been the efficient cause of the nomenclature to which I now allude. But even the metaphysics of Bonnet are not to be allowed to supply the chasms originating from our incapacities: neither an artificial nor a natural arrangement of the characteristic organs of animals ought to tolerate such freedom: an improved physiology discards it, and the inherent dignity of man, as a moral and accountable being, renders demonstrative the difference between the operations of human reason and the impulses of the instinctive faculty of brutes. A later and more successful division of zoology, by the immortal Cuvier, rests on the nervous and sensorial, and not on the circulatory and respiratory systems: and in order 1, *Bimana*, we find the species *man* placed at the head of the living creation, and no

longer *primus inter pares*. Nor would our labours here end : though we be disqualified from speaking with oracular precision—mineralogy would demand of us that homage be rendered to Theophrastus, and the elder Pliny, among the ancients, while the vast acces-sions to this science by the enterprise and sagacity of the moderns have given it the certainty of experimental knowledge, and placed this branch of investi-gation for its importance to the elegant arts and useful resources of man as second to none in the volume of nature. In a comparative estimate of the contributions of eminent men in this extensive field of pro-ductive effort, imaginative Germany, philosophic France, and harmonious Italy would prefer the claims of their respective sons, in accents too loud and too continuous to be resisted.

The vegetable kingdom in like manner, if properly treated, might solicit as her due our ardent contem-plation, and invoke the sincerest plaudits, by her three-fold claims, her precise classical terminology, the copiousness of her treasures, and her extensive utility. Botany, sacred by its antiquity and its salutiferous agency in primitive medicine, would summon our best efforts in its behalf by the dominion which it holds in the breast of every lover of the bounties of creation, as a study sanative as Hygeia herself, in its influence on her worshippers, and rich in variegated and attractive formations. Who would not aspire to participate in recreations such as those in which a Ray, an Evelyn, a Tournefort and a Haller delighted ? Who would

not strive to master a pursuit which, by its quotidian discoveries and advancements, repays its votaries with new truths ; and enter the list of that mighty phalanx of meritorious individuals who, in different ages and nations, have revealed its secrets and preferred its excellency ? Such a review of the progress and present state of the physical sciences would teach us the most pleasing and instructive part of history, the progressive development of knowledge, and the advancement of our species in arts, science, and civilization ; while we would indulge a juster and higher opinion of the capabilities and acts of the age in which we live. And though we might be reluctant to look to Hesiod or Columella for principles in practical agriculture, or to Aldrovandus or Rhondeletius for minute anatomy, or to Agricola for the philosophy of mineralogical science, we would, by the study of the writings of these master minds, the better comprehend the obligations which each successive age owes to its predecessor, and ever bear in grateful recollection the contributors who have reared to its present lofty state the intellectual fabric of man. It may justly be said that he who should execute such a theme would require the bow of Ulysses. But let us leave the acquirements and the wisdom of venerable Europe, and turn our reflections to a consideration of the New World.

That extraordinary era which gave wings to thought by the invention of the art of printing, was signalized by the discovery of a new continent, in extent nearly equal to one third of the habitable globe ; thus bring-

ing to light an unexplored field of investigation, of singular and peculiar interest to the student of nature. The comparatively recent period at which we date the addition of this vast portion of the world to our knowledge of the rest has sanctioned the expression, "the new world;" and in adverting to the character of its aboriginal inhabitants, its geological features, and fossil remains, its climate, and its natural productions, we are led to conclude that its natural history is no less new than is its geography. We would not imply by this remark an opinion that the American continent is of a more recent origin than other parts of the earth so long known. We might give scope to speculation, and notice the positions and mutations of organic forms; trace remote or near resemblances to what has been observed in other regions, in order to solve unmanageable phenomena with results more or less problematical or true. But we presume America to have received the impress of the great first cause contemporaneously with other parts of this terraqueous sphere, whatever may be our geological hypothesis. Sufficient, moreover, is now well ascertained concerning appearances still existing of remote antiquity, and our knowledge of the changes actually going on in the geological world, with the causes of their production, to reconcile us fully to the belief of the accuracy of this conclusion.

The peculiar position of America, as well as its great extent, invites our regard: stretching from the arctic polar circle to the fifty-sixth degree of southern latitude, its boundary lies fifteen hundred miles beyond

the extremity of the old continent. Hence the immense barrier it opposes to the sea and atmosphere ; passing through every variety of climate, capable of being the habitation of man, and fit to yield the innumerable productions peculiar either to the temperate or the torrid zone. To attempt the briefest notice of these various products would prove an undertaking of great extent. The grandeur of these objects affords a fine subject for philosophical consideration. Nature indeed has conducted her operations with a bold hand, and given them an extraordinary magnificence.

With the exception of the Himalayahs, in the southern division, her mountains are superior in height to those on the other portion of the globe : the plain of Quito, the base of the Andes, is elevated farther above the sea than the Pyrenees ; while the lofty Andes, though exposed to the rays of a torrid sun, are covered with perpetual snow. From such lofty heights descend her majestic rivers, the Orinoco, the Amazon, and the Plata, rolling onward to the sea, of a size and proportion to which those of the ancient continent dwindle almost into rivulets by comparison. Northern America is also characterized by remarkable features, extent, diversity of climate, and physical outlines of rare and interesting peculiarities. The course of her mountains occasions geographical distributions, worthy of the closest investigation : her rivers, the Mississippi and the St. Lawrence, ere they feel the influence of the tide, become arms of the sea rather than rivers of fresh water ; and that wonderful

chain of lakes more properly called inland seas, has nothing of a similar character elsewhere to which it may be compared.

The country of which it is our happy destiny to be inhabitants, is divided by Volney and others into three great natural sections, created by two chains of mountains,—the Atlantic region, lying east of the Alleghany mountains; the valley of the Mississippi, including an area of nearly one and a half millions of square miles, or the country watered by the Mississippi, the Missouri, and their numerous branches; the Pacific region, or the country lying west of the Rocky Mountains to the Pacific Ocean.

The Alleghanies consist of some four or five distinct ridges, with wide and fertile valleys interposed: their entire length may be some twelve hundred miles. The Rocky Mountains pass at a distance of five hundred miles from the Pacific, and consist of several elevated chains, occupying a breadth of three hundred miles, with deep intervening valleys. According to Major Long, their elevation is about twelve thousand feet.

But not to fatigue attention, the natural history of such a country cannot but excite the greatest interest in civilized man. As might readily be conjectured, there exists in each of these grand divisions physical peculiarities as to soil, climate, and productions of the greatest diversity, which might tax the industry of the longest life in investigation.

We are not permitted to enter into an examination

of the theories of Clavigero and Robertson on the intricate question as to the people by whom these vast regions were first inhabited. We assume the opinion as that best sustained by facts and reasonings, that the progenitors of all the American nations, from Cape Horn to the southern limits of Labrador, from similarity of aspect, colour, &c., migrated from the north-east parts of Asia ; and on like grounds we admit that the nations which inhabit Labrador, Esquimaux, and the parts adjacent, from their likeness to the American nations, and their resemblance to the northern Europeans, have been derived from the north-east part of Europe. Pennant has remarked, the inhabitants of the new world do not consist of the offspring of a single nation ; different people, says he, at different times must have arrived there ; and it is impossible to say that any one is now to be found on the spot of its colonization ; while a distinguished philosophical writer of our own, Albert Gallatin, contends that even with regard to the Esquimaux, who seem to be characterized by some striking peculiarities, there is no solid foundation for the opinion of those who would ascribe to them an origin different from that of the other Indians of North America.

A subject which comes more immediately within our scope at this time is that branch of physical research which considers the different groups of animals and plants which are dispersed over this immense surface. To comprehend this subject fully requires an extensive survey in zoological and botanical geogra-

phy. We must study with a clear discrimination the constant and mutable characteristics of animals, modified by geographical distribution, as well by the agency of the mountainous elevation and that of the sheltered valley, as by the latitudinal and longitudinal position. A similar principle of discrimination applies also to the vegetable kingdom. The intimate relation which obtains between the great variety in the families of plants and diversity of temperature, is among the recognized truths well understood by the philosophical botanist: of the animals and plants of the new world, however, we are justified in asserting that they are characteristic of the country, and form a subject of great extent, complete and, in their attributes, distinct. We may readily coincide with the philosophical Humboldt; they are adapted to the climate, and the climate is adapted to them.

The most casual glance over these extensive regions will bring to view the richest treasures for the consideration of the naturalist. For example, of the mammalia, the most remarkable fact which courts investigation, is the few species of that class which are common to both the eastern and western continents; and the many that are the appropriate inhabitants of the western: it is affirmed of the quadrumania, or handed animals, that about eighty-two species out of one hundred and eighty-seven are peculiar to America, not one of them being found in any other part of the world: of about one hundred and six carnivorous animals, well ascertained as peculiar to

America, not one is known to exist on the eastern continent ; and it is further stated, that all the mammalia which are common to the two continents, even to the extent of being considered as climatal varieties of the same species, belong to the northern parts of America, and almost all of them to the extreme north.

It is a proverb with the medical faculty that every climate, while it has its own diseases, is also favoured with its appropriate indigenous remedies. This principle of Divine harmony seems to be no less true with respect to the animals and the localities of a country. Some philosophers, as Clavigero, have affirmed, that the beasts of cold regions may have passed over the northern isthmus, which perhaps connected Europe, America, and Asia ; while the animals and reptiles peculiar to hot countries passed over the isthmus that connected South America with Africa. Pennant was of the belief that all the animals of America were originally derived from the north-eastern quarter of Asia, to which they had previously made their way from Mount Arrarat : nor is this speculation rendered the less feasible by the reasonings of Capt. Burney, in his late paper read before the Royal Society, in which he inclined to the belief that Asia and America are not only contiguous, but parts of one and the same continent. But it is difficult to reconcile this theory with the distinctive forms of animal life and the physical characteristics of countries. Whatever may be the migratory capabilities of animals, few attend the peregrinations of man. While, however, we allow

that the distribution of animals involves speculations of great complexity, and presents a problem which perhaps will ever be beyond the ken of human wisdom to solve, it is the imperative duty of the naturalist to collect every fact which can illustrate the characteristic localities of the innumerable species which constitute the animal kingdom, and trace the association of genera and species over the surface of the earth.

Admitting, to its fullest extent, the interchanges of place which occur among animals by reason of their migratory movements, whether accidental and irregular, or stated and periodical, and the complexity into which inquiries on this head are thus unfortunately involved, we, nevertheless, find to our entire satisfaction, that every country is characterized by various peculiar tribes, and many of them, although the farthest removed from what we consider as the central station in which all living creatures were originally placed, are naturally the worst prepared with the means of locomotion. Thus we find that the tiger, with his herculean strength, confines himself to the most beautiful of the Asiatic islands ; the panther crouches among the branches of the African forests ; the jaguar, of the new world, prowls along the wooded shores of the Orinoco ; the moose deer roams amidst the primeval forests of the North American continent, and the gigantic cetacea gambol beneath the ices of the poles.

The fur-bearing animals are principally confined

to the regions of perpetual snow in Arctic America ; and while it is ascertained that some are common to both continents, many, it is equally well known, are peculiar to North America. The musk ox is deemed to be an arctic quadruped, yet is it unknown both in Asia and Europe, while two races of deer and the prong-horned antelope are recognized only in America. The *Fauna Boriali Americana* of Dr. Richardson, contains many illustrations of a similar sort. The zoological aspect of the northern parts of British North America, according to this intrepid and enlightened traveller, the companion of Captain Franklin in his late expedition toward the North Pole, is more allied to that of Norway and Lapland and some of the corresponding parallels of Asia, than to the southern parts of the new world. The equatorial regions of Asia, Africa, and America, possess no quadruped which is common to more than two of those regions, and it might be said that none of the three possess a single mammiferous animal in common.

Melville Island, and the rest of the North Georgian group, may be affirmed as the most northern region to which our knowledge extends. In the more northern parts we have the polar bear, whose southern limits seem to be found at fifty-five degrees : as we retire from the north to the more southern latitude, we lose the musk ox and the icy hare. The distinguished explorer of Arctic Zoology has also thrown a large amount of information on the zoology of the

temperate parts of North America. The bison may be found far south, probably at the thirty-fifth degree of north latitude. Its characteristic positions are the great prairies to the westward of the Mississippi, where it may be seen in droves of countless numbers. Lewis and Clarke mention several species of the cerous, canes, and ursus, as inhabiting the plains on the banks of the Columbia river. The Rocky Mountain sheep and goat are, upon good authority, conjectured to be peculiar, and to differ essentially from the argall of the north of Asia. We have still further illustrative proofs of the effects which local peculiarities produce on the zoological character of a country. According to Dr. Richardson, the moose deer and the American hare are met with at the junction of Peel's river with the Makenzie. The didelphis forms a genus, according to Cuvier, peculiar to America; and I conjecture that we have rational grounds to infer that the castor fiber, which is found on the most solitary parts of North America, is a species distinct from that of Europe, which seems not to possess or exercise the faculty of house-building. If such be the fact, we can promptly reconcile many conflicting accounts of the beaver. We may, moreover, justly boast of the mastodon as our exclusive property, whose size is greater than that of the elephant, and of heavier proportions, and, as once, an inhabitant of North America alone. The fossil skeletons of two edentata, of great size, have been discovered in America, the megatherium and the megalonyx.

With the brilliant aids daily increased in this age of fossil zoology, I am yet disposed to receive with great allowance the remarks on this subject of an eminent writer, Dr. Lyell, in his work on Geology. The Siberian fossil remains which he has classified with the American mammoth, are a distinct and inferior animal from that of America, and truly a species of *elephas*, not *mastodon*. A too solicitous desire to establish a favourite hypothesis, has not unfrequently detached the best minds unwittingly from the path of a legitimate philosophy.

From the collected results of enterprising and intelligent travellers, it has been ascertained, with tolerable accuracy, that there are one hundred and forty-seven species of mammiferous animals in North America, eleven of which are fossils, and no longer occur in the living state, and twenty-eight of the cetaceous order. The remaining one hundred and eight are considered as American quadrupeds, and of these only twenty-one species are common to North America and the old world. Mr. Jefferson, more than fifty years ago, said, that of twenty-six quadrupeds common to both countries, seven are larger in America, seven of equal size, and twelve not sufficiently examined: that there are eighteen quadrupeds peculiar to Europe, and more than four times that number peculiar to America; and that the first of these, the tapir, the largest of animals peculiar to America, weighs more than a whole column of European. But we are not contesting the opinion of certain

foreign writers, who have alleged the inferiority of American animals, and the deterioration of those imported. We at the present day might search in vain for a well-informed naturalist who would grant an affirmative to a position of such tendency. Such a doctrine has, in fact, long since been demonstrated erroneous, and holds at present no place in the enlightened mind of the nineteenth century.

Our Ichthyology is rich and peculiar in many species ; and the law of limitation to particular localities is found to be sustained with respect to marine animals as well as those of the land : in short, naturalists have said that the species of whales differ, those of the north from those of the south seas ; and geologists have remarked that the external aspect of the skeletons of fishes from the gypsum formation of Paris, is very different from that of the fresh water fishes of the bituminous marl-slate, independent of their zoological characters.

Our American rivers abound in individuals who have their like in the waters of Europe ; and we have others exclusively our own. It is known that the fish of the Ohio and of other of our great rivers are peculiarly abundant both in number and species, yet few seem to resemble those of Europe ; and although the migratory attribute of many of the piscatory tribes renders it difficult to discriminate their natural locality, enough is understood to justify the assertion that we suffer not by comparison on this head. It appears that Lacepede, not many years since, described about

two thousand fishes ; and at this present time this number may be quadrupled. Baron Cuvier remarks that the amount of known fishes may be safely estimated above six thousand. Many of the fishes of our inland lakes have no superior for their rare edible qualities, and exist in quantities of surpassing calculation. If the fecundity of the New-York waters be in anywise a criterion for determining the relative proportion of this extensive class for the United States, we may justly set down the amount for America in large numbers.

In Herpetology we have sufficient to gratify the keenest desires of the most ravenous student in this department of nature. The extraordinary aspect and habits of a considerable portion of the reptiles in particular which are found in the southern and western sections of the United States, imperfect and superficial as our knowledge on the subject still is, invite to researches which promise to repay with adequate returns. I believe no naturalist has elsewhere found a more magnificent specimen of the *Testudo Coriacea* than that caught in the waters of our bay, and now exhibited in the American Museum of this city. Within a very few years, says Dr. Harlan, most important facts have been elicited, and many new and interesting species of reptiles have been added to a list formerly extensive. Several of the *Ophidea* are certainly peculiar, and the *crotalus horridus*, the most formidable and invulnerable of poisonous serpents, was deemed by one of the fathers of our country a fit

emblem to designate the national standard for the anticipated glories of the new republic created by the war of the revolution. For my own part, I concur in the wish of the patriotic Franklin, that the bald eagle had not been chosen as the representative of the American confederacy, and I think his reasons abundantly cogent: the eagle, says he, does not get his living honestly; he is a bird of bad moral character; he is cowardly—the little king-bird, not larger than a sparrow, attacks him boldly, and drives him out of his district; therefore he is not a fit representative of that yeomanry who have thus far driven all the king-birds out of the country. So far the opinion of Dr. Franklin. As to the *crotalus*, or rattle-snake, he is a genuine *aboriginal*; he is the beau-ideal of etiquette, and a type of honesty; he is never the first to molest, and he always gives due warning of his intentions by his rattles; and whenever his person or his rights are invaded, his aim is unerring and triumphant. Our Indians, who best know him, give him this chivalric character. I would wish it to be most distinctly understood that the observations I have just made are to be confined to the bald eagle. The indefatigable Audubon has lately given us a distinct notice and description of the *Falco Washingtonianus*, or the Washington Eagle. This noble bird first drew his attention while voyaging far up the Mississippi, in 1814. The Washington eagle is bold and vigorous, but jealous of his prerogatives; superior to vulgar expedients, he despairs the piratical habits of the bald eagle, and

honourably maintains himself without molesting the rights of others.

Did not time admonish us, we might take a survey of the ornithological treasures of South America and the North. With the exception of the migrants, almost all are peculiar and specifically distinct from those of other parts of the world. We know that temperature and other physical qualities of a country exert a mighty influence on the locality and habits of birds : still their migratory movements are influenced by causes which philosophy has not yet clearly explained. In tropical countries on the approach of summer they wing their way to temperate regions ; while those of these regions pass in large numbers to the polar circles : on the approach of winter the hyperborean regions are left almost desolate by a southern migration. The rapidity of flight and extent to which many of the feathered tribe range are sufficient to excite our highest admiration of the ways of providence : when exhibitions of this nature are exemplified by the lofty and sustained flight of the towering eagle, and by the albatros, with his outstretched wings, in his discursive range over the wide seas from the polar portions of the great ocean to the torrid zone, we may perhaps marvel, as anatomists, at the strength of muscular power ; but by how much more is our wonder increased when we find the frailest of the pennated tribe, the delicate and beautiful hummingbird, with its brilliant plumage, which winters to the southward of the United States, range in summer to

the fifty-seventh degree of north latitude, and yield in fact to few birds in the extent of its migrations. Kotzebue traced the ruff-necked Nootka humming-bird to the sixty-first degree of the western shores. Capt. King observed members of this diminutive size flying in a snow-storm near the Straits of Magellan, and if Oviedo is veritable authority, we may equally admire their instinctive courage. We are all familiar with the prodigious flight of the crow, the gull, and the wild pigeon of America, which in vast flocks sometimes darken the heavens like an eclipse. It is not a little curious as a subject of inquiry, by what impulse these organized beings are influenced in these migratory movements. Job hath asked, "Doth the hawk fly by thy wisdom, and stretch her wings towards the south?" The hibernation of the swallow has provoked discussion equally tedious as unsatisfactory. The eminently pious White of Selborne has at once said, the God of nature is their secret guide; and the sacred volume assures us the stork of the heavens knoweth her appointed times; and the turtle and the crane and the swallow observe the time of their coming.

The result of the latest investigations in ornithological science determines the entire number and varieties of birds at present ascertained throughout the world to be upwards of six thousand. The more southern climates exhibit the greatest riches in ornithology: thus it appears that in the Cape of Good Hope there are above one hundred more species of birds than are to be found throughout the whole of

Europe. Great Britain and Ireland produce only two hundred and seventy-seven different kinds of birds, of which one hundred and forty-two are land birds, and one hundred and thirty-five water birds and waders. The species of Europe and North America have been classed under one hundred and seven genera, of which sixty-four are common to both countries ; nineteen American, foreign to Europe, and twenty-four European, equally unknown in America.

The geographical distribution of birds, as might readily be inferred from their possession of wings, is of much wider extent than that of any other animals—a subject which Humboldt has illustrated with his accustomed talents. Even the ostrich, cumbrous as it is, and slightly favoured with these organs, is still known to roam to a great extent. The falcon is found in Greenland, in Europe, in New Holland and in North America. The white owl is seen in four quarters of the globe, and the golden plover occupies nearly as extensive a range. Major Long discovered the white-fronted swallow in the vicinity of the Rocky Mountains, and Dr. Richardson very recently noticed it as far north as Fort Chepewyan. Contrary to the opinion of Buffon, the tribe of parrots is most extensively distributed. Wilson found the Carolina parrot in the interior of Louisiana, and on the shores and tributary waters of the Mississippi and Ohio; even in the neighbourhood of Lake Michigan, in the forty-second degree of north latitude. How extensive are the treasures of North American ornithology, can

only in part be inferred from the constant accessions made to the number of individual species and varieties, since the publication of the Arctic Zoology of Pennant, by Parry, Ross, Franklin, Sabine, Dr. Richardson, Skinner, and other explorers of natural history. As natives, we have unquestionably no small number.

There is no indigenous bird of the old continent answering to the turkey of America. The grouse and the canvas-back duck are found in temperate America; few of the waders resemble those of Europe: the American flamingo is more beautiful than the European, and the scarlet ibis is peculiarly magnificent. Our mocking bird has established his unrivalled reputation as the *Orpheus* of the woods, over every other songster: the Baltimore oriole demands our regards for his remarkable plumage and other qualities. The condor, according to Lewis and Clarke, inhabits not only the whole chain of the Andes in Mexico, Peru, and Chili, but is frequently seen in the range of the Rocky Mountains. Several of the species of the wood-pecker have extensive geographical limits. Say found the red-headed species in the region of the Rocky Mountains, and Lewis and Clarke in the forests near the Pacific. The list might be swelled to an indefinite extent, were we to avail ourselves of the latest contributions of Wilson, Nuttall, and others. But we will more profitably wait the results of the labours of the indefatigable Audubon. In his third volume alone, just published, he informs us that he

has described no less than sixty species not noticed by his illustrious predecessor, Wilson.

The energy of the vegetable productions of the new world is displayed with a prodigality which commands our admiration. Nature, in this department, seems to have delighted in manifestations of her power, beauty, and grandeur, and to have unfolded a series of views well calculated to awaken desires the most urgent, and create associations the most noble, with our ideas of the beneficent author of all. To him who is solicitous of accurate attainment in his knowledge of this kingdom of nature, the present is as opportune as any former period. Though the operations of man, in his measures of settlement and civilization, have not been made without encroaches on the vegetable creation, yet the primeval forests of our country still rear their venerable forms, and impress us with delight and reverence, equally by their immeasurable extent and continuity, their gigantic size and altitude, their variety, and the mystery of their antiquity. Two centuries have indeed passed away since the landing of our pilgrim fathers; but it constitutes a small portion only of the longevity of these first occupiers of the American soil, who still flourish with verdure and purity in their pristine state and grandeur.

The concurrent testimony of naturalists sustains the belief that there is a stronger resemblance in the vegetable productions of the more northern parts of America with those of the eastern continent, than with

any other part ; and what may be deemed the polar vegetation has a further southern range than is possessed in Europe. Moreover, though we have generally yielded to the assertion that in the northern regions plants were very few, and of the most humble growth, yet we are justified in inferring, from the late exploratory journeys of Capt. Franklin and others, that vegetation is not, even there, so parsimonious and so feeble as travellers have been wont to affirm. In the country about the southern parts of Hudson Bay, the black and white spruces correspond with the coniferæ of Lapland : as we recede, however, from the polar regions, a consequent more promising vegetation abounds : many of the genera of plants are indeed the same as those which exist in corresponding latitudes on the eastern continent ; the species often vary. Botanists have given us ample illustrations of Canadian arboriculture ; and as we leave the country of the lakes, we have demonstrative evidence of the richness and magnificence of American forest scenery, even to the borders of the Gulf of Mexico. The prolific character and power of our soil, within this whole range in extent, and from the borders of the Atlantic to the Rocky Mountains and the Pacific ocean, has been observed by many.

It may with greater precision be remarked of the soil of the United States, that the fertility of the land of the eastern section is not so great as that of the western ; and that, both by the course of rivers and in valleys, it is most productive : nor need we place

in a more imposing light than has nature, individual examples of vegetable development, from the magnolia and the liriodendron of the south, to the *pinus Douglasii* of the great Pacific region, and other magnificent trees which enrich and beautify the lands ; nor enlarge on the inborn wealth inherent in the cotton plant of Georgia, the rice of South Carolina, the tobacco of Virginia, the cerealia of our own state, or the *zea maize* still more abundantly prolific over our wide-spread republic. The mass of forest trees are unquestionably to be found chiefly elsewhere than in the eastern states. The luxuriant south and southwest astonish by their fecundity, and convict Bulow and Parkinson, and other libellers, who tell us of the deteriorating qualities of the land, by the most invincible demonstration.

The Michauxs, father and son, are orthodox authority on the development of American forest trees : the former by his treatise on Oaks, the latter by his *American Sylva* ; and it must be considered as among the perplexing topics of inquiry, to what causes we are to attribute the popular ignorance on this subject, after so many years since the publication of these respective and convincing works. The species of large trees, says Michaux the younger, are much more numerous in North America than in Europe : in the United States there are more than one hundred and forty species that exceed thirty feet in height : in France, there are but thirty that attain to this size, of which eighteen enter into the composition of the for-

ests, and seven only are employed in building. He who is solicitous of precise information on this gratifying subject, will turn to the Travels and to the *Sylva* of this French philosopher. We can only cite a few examples. The hemlock spruce, so abundant in the northern and eastern states as to form three quarters of the ever-green woods, with a circumference of from six to nine feet, grows to the height of some seventy or eighty feet.

The *Liridendron*, so beautiful in its foliage and flowers, so useful in the arts, and so widely diffused in the Atlantic states and in the far west, exhibits a circumference of fifteen or sixteen to twenty feet, and elevates its head to one hundred and twenty or one hundred and forty feet. The cypress of the southern States and of Florida attains the height of one hundred and twenty feet, with a trunk of twenty-five or forty feet in circumference. We have the beech of more than one hundred feet in height. We have a great variety of the *juglans*, so ornamental to taste, so useful in the mechanic arts, growing to the height of from sixty feet to double that altitude. Long ago, according to Dr. Rush, there were ascertained to be more than ten millions of acres of the rock or sugar-maple; and according to Warden, in 1810, ten millions of pounds of sugar were made from it: at present, it is supposed that more than twelve millions of pounds of this article are made from the sugar-cane of Louisiana alone. This beautiful forest-tree, the pride of the genus *acer*, often reaches the height of

some seventy or eighty feet, with a proportional diameter. The Magnolia invokes stronger language than we can employ. The species of this genus are remarkable for their foliage and their magnificent flowers: some of them attain to the height of seventy or eighty, or one hundred feet. They may well be ranked among the most brilliant ornaments of a rural retreat; nor need we wonder at the reverential affection with which the unfortunate empress Josephine cherished the Magnolia in her garden at Malmaison.

What a formidable display we possess of the different species of oak: they seem to be multiplied according to the diversity of climate in our western continent. Michaux has described twenty-six species, and the number has been enlarged by Lewis and Clarke, Long, Nuttall, and other explorers. We forbear to notice them more minutely; nor can we mention only in name the linden and the tilia and the catalpa. The occidental plane, or sycamore, is not equalled by any other tree with deciduous leaves, either in the old or on the new continent. It is found abundantly, from Lower Canada to Louisiana and the Floridas. It possesses a richer foliage than even the Asiatic plane. Michaux saw one at Marietta forty-seven feet in circumference, four feet from the ground. In some situations, it is unquestionably the largest tree in the United States. Here I must conclude this enumeration of our vegetable productions with the pine, of which so great a variety abound.

The different species are of different value. Their

use in the arts is familiarly known and appreciated. They demand philosophical notice, and have received it from Lambert in his Monograph, and Michaux is enthusiastic on their importance. That amiable and unsophisticated disciple of nature, the late Mr. Douglass, who a short while ago was among us, but who has lately gone to the possession of felicities, purer and more exalted than those furnished even by the American forests, saw a species of pine upwards of three hundred feet in altitude ; and Michaux, speaking of this arbiter of the woods, says, this ancient and majestic inhabitant of the North American forests is still the loftiest and most valuable of their productions, and its summit is seen at an immense distance, aspiring towards heaven, far above the heads of the surrounding trees. He measured a white pine five feet four inches in circumference, and one hundred and eighty-four feet in length. He records of another, that its height was stated to be two hundred and sixty feet. In adverting to the sublime elevation of our native pine, it was aptly said by some European writer, the trunk of an individual American tree is enough to constitute a becoming spire for the proudest British cathedral ; and though not allowed on this occasion to descant on the excellence of this tenant of the forest as a material in ship-building, I am nevertheless just now forcibly reminded of an incident which took place, on my enjoying the society of some English savans, just after the close of the late war, at the house of Sir James Edward Smith, the

President of the Linnæan Society of London. Many interrogatories were put touching the natural products of our vegetable world. "Your ships are built of pine; you cannot boast," says one of the guests, somewhat sarcastically, "of the English oak."—"Talk not to the doctor of the English oak," interposed, with softer feelings, another, an accomplished lady of the Edgeworth school, "the American pine has done its duty."

But we must hasten to say a few words on our Mineralogical resources: and here you will anticipate me in the remark, that the treasures brought daily to light give us the fullest confidence to believe that America is rich in productions of this character. The effects of difference of climate and latitudinal and longitudinal position, have not that influence in this department of nature we have observed of animals and vegetables: the diversity in the old and new worlds is here not so great. The gold and silver and copper of the Andes have been duly appreciated; the mountains of America abound in metals of peculiar value. We need not speak of the treasures of Mexico and Peru. As to the United States, salt is widely distributed in great abundance, generally remote from the sea, in innumerable salt springs, in divers and distant sections, in extensive plains beyond the Rocky Mountains, and in mountainous elevations. The results of numerous manufactories give evidence of the extraordinary quantities of this indispensable material. Gypsum has been discovered in

very many parts, and most abundantly in this state. Iron is found abundantly in all the states ; and magnetic iron ore in large masses in excess, has been noticed in the White Mountains of New Hampshire, in the mountains of New Jersey, and elsewhere. Ores of copper are recorded in various parts of the Union, particularly in New Jersey. The same may be said of lead in many states, and to a wonderful extent in Missouri. Zinc, antimony, black lead or graphite, molybdena, &c., in some quantity. Coal has providentially been found to an immense extent, and we have strong data to infer that, ere long, either the anthracite or bituminous formation will be ascertained to exist in all the individual states. The precious metals—gold, derived from Virginia and North Carolina, and silver, from those and other localities—are essayed to an extent commanding importance as objects of national legislation. In the incipient state, therefore, of geological investigation, we have learned enough to argue the most triumphant returns.

With this hasty, and necessarily imperfect exposition of the ascertained resources of our physical condition and of our productions, we must at present be satisfied. We need not prophetic aid in forming a conjecture of what ultimately are the destinies of a country, the inherent resources of which are such as we have thus rapidly sketched. The impartial investigations of a day not long distant, will convince us that the surest monuments of our Republic's great-

ness and power are yet to be created. Nor is it saying too much, that neither the people at large, nor our practical statesmen, can remain long satisfied with our present limited scientific foundations, and our consequently defective views of a climate and a country of such powers. A thorough knowledge of the available means of a people, is the firmest groundwork of successful legislation. All studies which promote such knowledge must increase the enjoyments of life, and augment the aggregate of individual happiness. If the commands of wisdom be regarded by a rational being, the spirit of the patriot cannot rest quiet when awakened by the contemplation of what the American confederacy now is, compared with what it was a century ago, and with what it seems destined to become a century hence. One hundred years past, the entire population of the colonies scarcely doubled the present number of inhabitants of this city alone. The child is now born who may look forward to the astonishing results of a progressive population favoured by laws the dictates of their own intelligence, the proprietors of a country in which he now lives, and which still presents to the eye an almost untrodden forest, which within the lapse of that time will be occupied by at least one hundred millions of people. What a gigantic theatre for the actors of that day! What scope for the man of science, and the writer of literature, and the moral instructor! How subordinate the rank of

many now flourishing nations ? Imagination is lost in the colossal prospect.

Let me then ask my indulgent audience, of the numberless institutions established in different sections of our land, for the promotion of the higher departments of science, if any there be possessed of more intrinsic claims to consideration than that in behalf of which we address you to-day ? If the objects of life depend upon the due preservation and cultivation of the animal, the social, and intellectual powers of man, assuredly this Lyceum is the proper school in which much of that knowledge ought to be imparted. The many subjects which are inseparably connected with the first of these divisions, according to the soundest political economy, are among the immediate topics of their inquiry ; the second, if duly considered in several of its nicest relationships, falls distinctly within the scope of their deliberations ; and of the third, man's mental gratification—the highest of which he is susceptible—the study of nature holds indubitable importance.

Let me then, in the spirit of generous research, put forth one or two interrogatories, prompted by the present occasion. How far have these abundant natural treasures of the new world become the objects of investigation ? What progress has been made by a people thus favoured, in unfolding, for the benefit of man, these extraordinary bounties of creation ? Has a corresponding spirit of research characterized our indigenous writers and philosophers, with such mate-

rials at command? We will trespass a little on these or kindred subjects, and, in our cursory notice of what has been accomplished, respectfully offer a few incidental suggestions on what we are imperatively bound to perform.

Intellectual improvement is not, nor can it ever be, the first object of attention among a people encompassed by the complicated difficulties of first settlement, and restricted by the necessities inseparable from so peculiar a condition. Their immediate and pressing wants must first be supplied. Yet notwithstanding these circumstances, we find that the mental energy of our first settlers, and of their immediate descendants, was displayed to an honourable advantage by their exploring new and diversified objects, and by their descriptions of what seemed to them of most general regard. The mountain and the valley; the marsh and the sea-coast; the animals and plants, and fossils of an untrodden country, naturally possessed with them an inherent interest. The impetus which was thus early given to the domain of knowledge has, fortunately for their posterity, advanced forward with an accelerated velocity, and we cherish with becoming reverence and gratitude the memory of the Cushman's, the Mathers, the Winthrops, the Winslows, the Mortons and the Princes, equally as we regard the labours of those enlightened and philosophic men, who, in their transient visits among us, with comprehensive minds, have found in America themes profitable both to the new and to the old world.

Within the compass of human investigation, no inquiry more imperiously challenges the efforts of the intellect than that which embraces facts involved in the discussion on the origin of the different varieties of the human species, and the dispersion of particular races or tribes of men. Prolific in conjecture, it nevertheless is rich in truths of the deepest interest ; and while hypothetical views are admitted with a becoming scepticism, the questions propounded involve researches of the most ennobling character. It is familiarly known that the philosophical world has long been, and still continues, much divided on the subject. The ancient Greeks and Romans inclined to the opinion that every country has its indigenous stock of inhabitants ; and this theory saved a vast deal of trouble in attempting to account for the first population of insulated and distant countries. In modern times, Linnæus maintained that, in every species of plants as well as of animals, only one pair was originally produced ; and among his chief arguments in support of his views, he considered that nature had provided the requisite means of multiplication and dispersion : such, for instance, as we see in the seed of the poppy, or of the tobacco-plant, one of the latter of which will multiply more than forty thousand fold. In a subject of such great extent, one might have thought that the origin and history of our tribes of Indians would have awakened a larger share of attention among American writers than it has received. The accounts of La Hontan, Clavigero, and

many others of the Jesuit travellers, are known to partake too largely of fable, and several of our own indigenous authors, as Adair, Boudinot, and Heckewelder, to have been too much controlled in their statements by fanciful and preconceived theories.

The basis of a sound inquiry as to the original people of America, is founded on a preliminary disquisition on its early physical constitution, and its dismemberment from Central Asia. The extraordinary discoveries recently made at Palenque and Vehamel throw great light on the subject. The traditions of the Indians discountenance the idea that they were the original inhabitants ; and the Mexicans affirm that their forefathers lived ages past at the north. The studies of the various antiquities found both in Mexico and in our western and northern states, would favour discovery as to the original occupiers of the soil, and of the numerous tribes of North American Indians. When we further reflect on the great variety of the different tribes, readily recognized among the American aborigines, or the differences perceptible between those of the western and northern parts of America, and of the eastern and southern and Floridian, we shall be satisfied that the subject demands not merely a close survey of the physical structure and constitution of the American races, but a philological examination of their language.

According to Dr. Pritchard, Professor Vater was the first who observed the remarkable analogy of structure which exists between the most distantly

separated of the American languages ; and herein he differs essentially from the views of Mr. Jefferson : and Baron Humboldt, the highest authority we can cite, coincides with Professor Vater. We have further concurring testimony on the structure of the American language by one who has recently enlarged our knowledge by ample and legitimate sources of information, Dr. Duponceau, of Philadelphia, and who has applied the term *polysynthetic* to all the American languages which exist from Greenland to Cape Horn, "although these languages differ essentially from the principles of construction which are to be found in the idioms of the old hemisphere." Whether these bold and ingenious speculations be grounded on data beyond the reach of controversy will probably soon be made known by the philological acumen of a distinguished patriot and statesman now resident among us, whose work just announced for publication by the American Antiquarian Society, is so anxiously looked for. I allude to the Synopsis of the Indian Tribes within the United States, east of the Rocky Mountains, and in the British and Russian possessions in North America, by the Hon. Albert Gallatin.

In a periodical work of classical excellence, we have been lately favoured with some interesting details concerning the most interesting relic of antiquity ever discovered in North America ; the remains of a human body armed with a breast plate, a species of mail, and arrows of brass. It was found in the town of Fall River, in Bristol county, Massachusetts

about two years since. I must refer to the work already cited for circumstantial particulars. If the body found at Fall River, says the anonymous writer, be one of the Asiatic race who transiently settled in Central North America, and afterward went to Mexico and founded those cities, in exploring the riches of which such astonishing discoveries have recently been made, "then we may well suppose, also, that it is one of the race whose exploits have been immortalized by the father of poetry." I have referred to this example of the antiquities found in our country, because of its being so recent and so important. It strengthens the assertion that this wide field of research has, as yet, remained comparatively uncultivated.

There is, unquestionably, strong evidence of an ancient population having occupied America, different from that of the Indians ; but we must refer to the discoveries published by our antiquarians, as Rafinesque, Drake, Atwater, Breckenridge, Mitchill, and many others. Within a few days past we have seen it announced, that the Royal Society of Northern Antiquaries at Copenhagen, have projected a work, denominated *Antiquitates Americanæ*, which is intended to contain a collection of Icelandic and other Scandinavian manuscripts, relative to the discoveries of this continent by the Scandinavians long before the time of Columbus, and even as early as the tenth and eleventh centuries.

A volume, entitled American Antiquities and Discoveries in the West, by Joseph Drake, is also de-

serving of consultation for the variety and number of its facts and conjectures. It is replete with papers from some of our most industrious and successful writers, and countenances the theory that emigrations by land, as well as by sea, were performed at a remote period. Nor would justice be done to so curious and fertile a subject as the origin and character of our Indian tribes, without a close perusal of the discourse on the Iroquois Indians, by the late De-Witt Clinton, an honorary associate of this Lyceum, and of the learned address of the Rev. Dr. Jarvis before the Historical Society of New-York. To the valuable contributions which have been made by the late Dr. Barton in his *New Views of the Origin of the American Tribes*, and by Dr. Duponceau, both of Philadelphia, it is with becoming state pride that I refer to our lamented Clinton, whose portraiture of the Romans of the West will long remain among the most enduring memorials of his comprehensive mind, and varied knowledge and talents.

I will further add, it behooves us to appropriate a becoming portion of our earnest efforts in investigating the physical and intellectual attributes of the red man of America. With a formation singularly ennobling, and with original mental endowments of rare and surpassing order, a pseudo-philosophy has too long debased him in the rank of being: it is reserved for us, who have the means of best knowing him, to be faithful to ourselves, and as lovers of humanity to vindicate his claims as second to none of

his species in physical conformation, in loftiness of genius, in eloquence, and in the arts of war. That the subject is rich in novel inquiry, will the more readily be acknowledged when we are given to understand that even the celebrated Blumenbach, who has so profoundly discoursed on the varieties of the human race, has never been able to enrich his great cabinet with an entire skeleton of the North American Indian. The biography of Red Jacket and of Corn Planter, natives of our own state, present matters worthy of the closest reasonings of a Locke and a Condillac. We therefore can appreciate at a higher rate the Aboriginal Port Folio of Mr. Lewis, now issuing with such felicitous illustrations, and the graphic sketches of our countryman Catlin.

The youngest of the physical sciences is, unquestionably, Geology. Scarcely thirty years have elapsed, since this branch of human pursuits seemed little more than the study of crabbed names; now it solicits our attention by facts, wonderful for their multiplicity, and pregnant with results of the deepest interest. The fanciful creations of untenable conjecture have yielded to theories of sober result; and the formation of the earth, derived from laws the deductions of a rational philosophy, has shed a light on geological investigations of the clearest import in unveiling the minutest operations of nature. It is flattering to our pride, that the number of American writers who have entered on this attractive science, is already so great. To the first president of this

Lyceum may be awarded, I think, the title of the father of American Geology: and it must ever remain a cause of regret, that he who seemed so peculiarly qualified to elucidate the physical structure of his native country, had not subsequently directed his copious intellect to a fuller exposition of our geological phenomena: I allude to the late Professor Mitchill, whose Sketch of the Mineralogical History of the State of New-York appeared as early as 1797: an elaborate document of unquestionable excellence, and which, without due acknowledgment, has been freely appropriated by Volney and other travellers. In this paper, Dr. Mitchill employed the then popular nomenclature of Kirwan and Cronstedt, and advanced the opinion that the United States furnished indubitable proofs of volcanic formations, in which belief he has been sustained by facts in our own state, and by the decisions of several recent observers. Subsequently Dr. Mitchill, in his collegiate course of lectures, was almost an exclusive advocate for the doctrines of the Wernerian school, to which he yielded his conviction, from the great ability with which they were enforced by the celebrated Scotch Professor, Jameson, of Edinburgh. Our palisado rocks, and some few geological occurrences in the south-western regions of the United States, constituted the prominent exceptions to the Neptunian theory, as taught by Mitchill: at least such was the case when I listened to his University instruction, in 1811. Another ardent disciple of nature, Mr. M'Clure, has also contributed to the Ameri-

can Philosophical Society, *Observations on the Geology of the United States*, with remarks on the probable effects that may be produced by the decomposition of the different classes of rocks on the nature and fertility of soils, the merits of which essay have been judiciously estimated.

I have thus noticed these productions of Mitchill and M'Clure, as among the first prominent efforts of science to unfold our geological and mineralogical treasures, and the catalogue of eminent individuals who are entitled to our consideration for their services in this branch of inquiry might be greatly swelled with the enumeration of the names of Elliot, Godon, Hayden, Drake, James, Silliman, Van Rensselaer, Eaton, Clinton, Jackson, Macneven, Dana, Townsend, Alger, Clemson, Vanuxem, Morton, Taylor, Smith, Troost, Rogers, &c. The system of Mineralogy, by Cleaveland, which has elicited the admiration of both worlds, gives us an ample exposé of the mineral riches of America, while the late researches of Professor Hitchcock hold out in confident grounds the flattering prospects of abundant coal formations, anthracite and bituminous, widely distributed throughout the Union.

Our sister state, Pennsylvania, has lately entered into the career of geological investigation with earnestness and power; and the Transactions of her newly-organized society, worthy of the city whence they emanate, bear evidence of the commanding attitude the cultivators of this branch of physical study among them are destined to maintain. Mr. Taylor's

papers on the coal formations of that state, with those of Troost, of Clemson, and of Conrad, are justly classed among the most valuable of the many excellent contributions which that work contains.

Restricted as I am on this occasion, I nevertheless cannot omit to remark that the Geological Report of Mr. Featherstonehaugh on the elevated country between Missouri and the Red River, contains facts conducive to the interests of the geologist and to the investigator of organic remains. The indisputable evidences of successive changes in the structural condition of the globe which this science now explains, affords such positive criteria by which our acquaintance with the earth may be advanced, that this study becomes an imperative duty for the mineralogist to master with all imaginable ardour, in order the more completely to classify strata; and we may appeal to the admirable work of Professor Hitchcock in demonstration of the manner in which such an undertaking may be achieved. Indeed, it is scarcely possible to point out a pursuit to which human intelligence has been directed, which will repay its cultivators with greater honour, or subserve the cause of patriotism on a larger scale. The materials are so full, the subject so novel, and the results so beneficent, that we might search in vain for any one to contest our declaration.

That the empire state should remain without a geological survey, conducted by legislative provision, is a reproach which, it is anticipated, will shortly be

removed: and the hope is cherished that the Report officially offered to the constituted authorities, by the secretary of state, Mr. Dix, will be carried into execution by gentlemen competent to the task. The plan by districts is admirable, and I echo the sentiments of the scientific, when I add, that few papers of so able a character have ever been presented for public adoption. There is too much knowledge of the physical sciences extant, for any one at the present time to gainsay, with the expectation of making proselytes, the positive truth, that a geological examination is the only sure means by which the inherent treasures of a country can be unveiled, and made useful to commerce, science, and the arts; and the report of Mr. Secretary Dix is confessedly so rich in inducements, that every possible motive is held out to prosecute the plan which he announces.

That the undertaking is too much for individual appropriation is manifest; and the aid of government is very properly invoked for its satisfactory accomplishment. May we cherish the hope that in the appointment of qualified persons for the honourable work every consideration of private and local interest will be discarded, and that, unswayed by the sinister motives of party politics, the gentlemen selected may be worthy of the occasion and the momentous object. The Honourable Stephen Van Rensselaer, with a munificence and a disinterestedness alike challenging our approbation, is too well known to you for his generous zeal in facilitating the cultiva-

tion of this department of physical truth, as well as several other pursuits for the amelioration of man, not to receive our passing tribute. The valuable survey of the county of Albany, executed at his expense, by Professors Eaton and T. R. Beck, is here referred to in evidence of his patriotism and discernment. The scholars of such a votary of important knowledge, must partake of the zeal of their patron. Moreover, New-York, in unquestionable language may say she is the special field of geological inquiry, as the briefest statement of her treasures within the earth already ascertained, would absorb several hours in the enumeration. The wonders of Niagara and the Trenton Falls, and the antiquities of Onondaga, are of themselves enough to secure returns for the largest appropriations. But when we further reflect that our state has been signalized by the discovery therein of organic remains of the largest of an extinct race of animals, whose zoological character has unveiled new wonders to the learned, we are stimulated in pushing on the boundaries of scientific knowledge.

Besides, in the march which geology is now making, comparative anatomy becomes an essential aid, as plants, as well as animals derive the materials of which they are composed from the mineral kingdom : the discoveries thus brought to view in this department of nature create additional impulse in the breast of the explorer of nature's laws. I well recollect the fervour of expression with which the late John

Bell, the Edinburgh anatomist, remarked in my interview with him, on the extraordinary advantages which America afforded for exploring geological phenomena. The organic remains already discovered in America, said he, almost compel me to a visit thither; "for, with your remarkable bones in my hands, I could form a new theory of the earth." Like Cuvier, this great anatomist and surgeon thought that the fragments of bones of extinct animals in the hands of the philosopher, were sufficient to elucidate the history of the primeval world ere man was created. The contribution which Dr. Harlan of Philadelphia has just made by his rich volume on this and kindred subjects, will be estimated by every lover of wisdom: the medical reasoner and the man of general science will cherish him with the kindest feelings. I am restricted in this place to the mere mention of the name of a work worthy an enlarged notice, and lately published by Dr. Morton, of Philadelphia, entitled, a *Synopsis of the Organic Remains of the Cretaceous Groups of the United States*; and to the several papers of Dr. Dekay printed in our annals. Let me add, though our *Transactions* are enriched with communications on this novel topic, we are equally bound by the splendour of discovery and the importance of its results to redouble our zeal in our elaborations on this subject.

Fossil ichthyology and fossil botany, both directly associated with and constituting a part of geological science have very recently assumed a high impor-

tance : the work of Professor Agassiz, just published on the first of these subjects, has brought from its secret place, to manifold light, irresistible evidence of the great usefulness of inquiries on this head ; and it argues well of the zeal of my countrymen, that we have already had proffered us some singularly curious and novel facts on fossil fish, by Professor Hitchcock, for more ample details of which I must refer to the scientific Journal of Professor Silliman. Fossil botany, longer prosecuted, is also immediately subservient to the elucidation of fossil zoology, stratification, and geology. The most satisfactory paper which brings itself to my recollection on this interesting subject is that by the Abbe Correa de Serra, as printed in the Royal Society Transactions for 1799, entitled an Account of a Sub-marine Forest on the East Coast of England. I am led particularly to specify this paper from the well-known scientific reputation of its author, and because it contains reasoning of an awakening interest at the present time. Several American Naturalists have found resemblances of a similar character in our own country ; for example, the phenomena on the coast of Cape Cod, and on the banks of the Connecticut River ; and thus have the followers of truth an admirable philosophic guide.

There is another matter closely connected with some of the preceding references, which ought to excite our admiration. Associated with geology, is hydrology. The survey of the coast by the United States government, conducted by Mr. Hasslar, has

elicited many valuable facts for the natural philosopher; but we are yet grossly in the dark as to some of the leading phenomena which exist in the water by which we are surrounded: as the temperature and depth of our great inland lakes. Scoresby, Sabine, and Parry, have ascertained that the arctic sea increases in temperature with the depth. We are ignorant of the saline contents of our atlantic waters, and of the chemical products of our lake waters. Perplexing doubts involve our results as to the assignable cause of the phosphorescence of the sea; credence is given by some to the speculations of Mitchill, while Jameson, by others is deemed to have deduced inferences more tenable. Nor am I aware that any American, since Dr. Franklin, has traced the force of the currents of the ocean, though Beechy and other English navigators have very lately increased the number of our facts on this head. When we reflect that the waters of the earth cover three-fourths of its surface, and sustain myriads of animated beings, more than people the atmosphere and the dry land, we must be persuaded of the vast accessions to natural history that are to be made by our acquiring a profounder and more extensive acquaintance with every thing in relation to them. The naturalist who accompanied Kotzebue describes the waters of the polar seas as swarming with animal life; with medusæ and zoophytes, moluscas and crustacea, besides innumerable fishes: and you all are familiar with the labours of Mr. Ellis on the nature of the

corallines. Our countryman, the late Jonathan Williams, deduced some novel and important facts from experiments which he instituted in the waters of the Gulf Stream: though made some forty years ago, Americans, I am afraid, are more indebted to Sir Humphrey Davy for bringing the deductions of Williams to our recollection, than we are to our own spirit of inquiry. No feature in the physical formation of New-York is more remarkable than her inland seas, and yet, with the exception of Clinton, hardly another has ventured an opinion as to their primary constitution; whether they were not originally saline. The exuviae of marine animals discovered within them would lead to the inference that the whole district of country in which they are was originally covered by the ocean. The same imperfect state of knowledge pertains to almost all we have yet promulgated as to the manner in which our unrivalled Hudson has been formed. The labours of Mitchill, Williams, Patridge, and Pearce, have not rendered such an inquiry superfluous.

To this casual notice of our marine and inland seas, we may add a passing remark on a congenerous subject, our mineral waters. These treasures of the country attracted some scientific attention at an early day, and the observations on the constituents of the waters of the Virginia springs seem to have been the forerunner of a great number of the analytical expositors of other mineral waters found elsewhere. Humanity derives fresh aids for the exercise of her

powers, by a closer study of these important remedial agents, from a practical investigation of their chemical and medicinal properties. Since iodine is found to exist in many of these waters, where it was least expected, a philosophical examination of our thermal and other springs becomes vitally interesting. This newly-discovered medicine has wrought the most healthy influence on the goitre of the western country, since its introduction into practice in that section of the state, in 1823, and its value as a constitutional renovator is admitted by clinical experience. The waters of the mineral springs of Balston and Saratoga have for a memorable period been the heralds of their own virtues. Several of them are now deemed to possess iodine. The sulphurous waters of Avon, in Livingston county in this state, will, as their merits become known, be recognized for their potency and their sanative operation in a large class of physical infirmities. I apprehend that, as in most other sulphurous springs, iodine will also be found an important constituent in the composition of the Avon waters, and this herculean remedy can scarcely be over-estimated. The volume of Dr. Bell, on the mineral waters of the United States, recommends itself to the inquirer of this too-neglected study.

The zoological kingdom is avowedly prominent among the subjects which the Lyceum professes to investigate. I have already adverted to the multitude and magnificence of its objects, which our country possesses. It is not to be concealed that for the

greater portion of our knowledge of them, we are under obligations to enlightened and casual visitors from abroad ; and however well meant their endeavours, and valuable their services, to this source we are compelled to attribute the origin of many of the errors which have been promulgated. As the geographical distribution of animals, as well as of plants, is a branch of natural history of but recent date, its manifold advantages in generalizing the numerous facts connected with the physiology of animals and vegetables, is of consequence, as yet, but partially estimated. It assumes the highest importance, however, when we profoundly study American Natural History. Prompted by the true spirit of research, inquiries conducted by this aid will unfold the numerous ramifications in which such pursuits unavoidably lead, and which are otherwise too indistinct for clear elucidation. We thus place in a subordinate rank of operation, temperature and the configuration of a country, and are constrained to consider the distribution of animals as fixed by the will of the Creator, rather than certainly regulated by any isothermal lines. This doctrine has been ably sustained by Kirby, as most in conformity with the general tenor of well-recognized truths. These views, I may subjoin, are corroborated the further we prosecute the study of our indigenous animals : for we will discover that analogical reasoning is too hazardous to be extensively applied, however subordinate we may occasionally find it in investigating the fauna of a particular

district. If these principles were not established on a satisfactory basis, we should find a greater similarity in the animals of America, of Asia, and of Africa, in reference to corresponding latitudes, than we know certainly obtains. Let me remark, that this curious topic, so ably elucidated by Humboldt, though not divested of ambiguity, is a suitable subject for the enterprising spirit of the American naturalist.

I am aware that, so far as regards the arctic circles, the objections which have been thus slightly thrown out against the theory of climatal or latitudinal divisions, as too arbitrary for the geologist, encounter some difficulties; inasmuch as these regions contain not only genera, but numerous species common to both continents. The Fauna Boreali Americanæ is proof in point. But as has been remarked, this theory loses all its force when applied to such discussions as are made to include the tropical region of Asia, America, and Africa, in one province, and the southern extremities of America and Africa, in another.

Let us, however, hasten our remarks: of the natural history of many animals, even for ages known, and often described by able pens, much is imperfect, much erroneous, and demands the exposition of more competent observers. The metropolis in which we reside favours us with great opportunities of practically proving the verity of this assertion. If the Olympic games were rendered subservient to the advancement of a knowledge of noble animals, by the ancients, and the menageries of Alexander were the delight of princes,

and profitable to his master, Aristotle, assuredly the Zoological Institute organized in this city, may be made tributary to the same laudable end. And, indeed, such it has already proved, though but an establishment of yesterday. The habits of animals are there closely observed, modified, however, by circumstances ; their diseases better understood, and their anatomical structure unfolded, as occasions offer. From opportunities arising from this source, gross popular errors in the anatomy and physiology of the hyena were lately disclosed, and to the same intelligent gentlemen, Doctors A. Sidney Doane and Benjamin Drake, of this city, are we under obligations for additional confirmatory facts on the relative development of the brain and nervous system in other animals. These anatomists have also, by direct inspection, lately shown from the distribution of the nerves, that those of the huge rhinoceros, of weight more than eight thousand pounds, were not larger than those of the orang outang, weighing only sixty pounds. Hence we are led to infer, that we are to scrutinize with more minuteness the aggregate proportion which the nervous development of different animals bears to their respective brains, to determine with surer results the sensorial and muscular powers, the quantum of sagacity and intellectuality, so to speak, belonging to the several members of the animal kingdom.

From the period of Tulpus, in whose work we have the best figure of the orang outang, to the time of Cuvier, philosophers have busied themselves with

descriptions of the simiæ. The reports of travellers, as well as the specimens of such animals exhibited in Europe, demonstrate to the clearest senses, that the man-like simiæ, whether the orang outang of Borneo, or the chimpancé of Angola, as well as the long-armed monkey or gibbon, are greatly different in their skin from man; and other peculiarities, dwelt upon by Gmelin, Bontius, and White, might be easily referred to, as well understood. But I will venture to affirm, that our precise knowledge of the most remarkable one of this species has been improved by the careful anatomical differences recorded by Drs. Doane and Drake, whose names I have just mentioned. Nor am I unmindful of the results which zoological data of this nature, founded on comparative anatomy, would supply, in arming us with materials to grapple with the subtle disquisitions of White, in his ingenious work on the Regular Gradation in Man. But that to which I would still more earnestly invite the services of this society, is to furnish discriminating and scientific accounts of our native zoological productions. The time has arrived when the reproach is too great longer to rest contented with the imperfections which mark our knowledge of this branch. Several of our most remarkable indigenous animals are without a becoming historian. Even the accounts of the moose deer, and the elk, the badger, several species of the bear, the fox, and many others, are so confused as to perplex the European investigator. How ample the field of inquiry is, may be learned from the Arctic

Zoology of Richardson, the several explorers who have recently visited our north-western territories, as also from the early labours of Bartram in Florida, and the succession of authors to the late productions of the lamented Godman, the Fauna of Harlan, and the recent valuable edition of Cuvier, by Dr. McMurtrie. The observation seems to be too well established, that many of our native quadrupeds of the largest size have progressively disappeared as cultivation has advanced: but while the difficulty of acquisition has increased, the value of successful research will, with every true lover of nature, meet with a corresponding consideration.

If, moreover, we Americans are less amenable to censure for ignorance of the Ornithological history of the United States, let us render homage to those eminent individuals who have achieved the task for us; and frankly avow our obligations to Wilson, and Bonaparte, and Audubon, and Nuttall, for having more ably and more beautifully illustrated this department of animated nature than all preceding naturalists, and presented this study for philosophic contemplation equally attractive by its facts, as captivating by the diction in which they are conveyed.

I am aware that most of my hearers are more familiar than myself with the peculiar merits of these unrivalled naturalists; but I could not omit this slight recognition of their excellence, nor would I thereby cast down the hopes of the aspiring. Our ornithology is not yet completed, though we justly prize the la-

hours of our associates Cooper, Dekay, Le Conte, and other contributors to our Transactions; nor is the enterprize so perilous as to deter future efforts, or abate the hope of distinction in this line of exertion. The matter and the manner are both within the reach of our native writers, and the salutations of the enlightened await each new result.

Our fish, reptiles, and insects, and our conchology, all demand further elucidation. Natural history is now so philosophically and so discriminately considered in the classification of its cultivators, from the mammalia down through all its characters, to the organization of even the zoophyta and the infusoria, that, in contemplating this vast subject, we may fairly say that comparatively nothing, in some of these departments, has as yet been done by us. The monograph of Dr. Mitchill, on the fishes of the waters of New-York, may be considered among the first in merits, as it is unquestionably the earliest production on the subject of the piscatory tribes of the United States. He has been ably succeeded by the valuable contributions of M. Le Sueur, and by Dr. Smith, of Boston; by the catalogues of Mr. Greene, Mr. Earle, Mr. Barnes, and Col. Totten, on the Testacea; and a distinguished associate of our society, Dr. Jay, has also just printed, for common benefit, a valuable Catalogue of the Specimens contained in his extensive Conchological Cabinet.

Dr. Holbrook, of South Carolina, has very recently given us the earnest of a work of extraordinary im-

portance on our Herpetology, and secured to himself the renown of both worlds by the freshness of his materials and his lucid expositions. Dr. Harris, of Boston, has prepared a list of the insects found in the State of Massachusetts: it embraces two thousand three hundred and fifty species; and all of you are aware of the talents which have been given to this branch of natural history by our colleague, Capt. Le Conte, whose work is now publishing with suitable elegance in Paris, and will unite in the solicitude we feel, that renovated health may enable him to complete what has been so auspiciously commenced. The contributions of Mr. Say, of Mr. Le Sueur, of Dekay, of Hentz, of Gould, of Harris, of Nuttall, with many writers in the Academy of Philadelphia, in Professor Silliman's Journal, and in the Annals of our Lyceum, here present themselves to our recollection, in reviewing the labours of our predecessors and contemporaries in the several departments of natural science.

In inviting your attention to these several subjects, all so imperfectly investigated, and yet so full of results, I am desirous to impress you with the importance of cautious observation and precise description. It is far better for the mind to be left entirely free to occasional conjecture in resolving doubts, than to be encumbered with the false or hasty deductions of careless investigation. Some writers on natural history are too frequently infatuated by the fatal desire of novelty: hence the interminable catalogue of synonyms we have to encounter: the vanity of discovery

outweighing the interests of real knowledge. I fear that the eminent naturalist, Rafinesque, is not wholly secure from this imputation. It has well been observed by Dr. Dekay, "New nominal species perplex the student, increase the labours of the critical naturalist, and render the study of natural history tedious and difficult. If it was generally understood (continues this eminent naturalist) that it is more meritorious to extinguish a single nominal species than to establish a dozen new ones, it would effectually check the present mania for making new species on slight foundations. This also leads to an overweening anxiety to secure priority; and hence descriptions are liable to be drawn up in a crude and hasty manner, without reference to the co-ordinate characters."*

Let us rapidly glance at the vegetable kingdom; the subject, properly handled, might germinate into a volume. A triumphant list of American writers might be recorded, who have exposed the riches and the wonders of our vegetable productions. There seems to have been, from a remote period, a peculiar disposition among our countrymen to studies having that object in view. Not a few of the earliest explorers dwelt with rapture on the treasures of vegetable America; and some of the most conspicuous predecessors of Linnæus, as well as that great man and his immediate disciples, seize at every occasion, to augment their knowledge of the novel and extraordinary display of vegetable existence which 'this country

* Dekay: Address to the Lyceum of Natural History of New-York.

furnishes. In an unpublished manuscript correspondence, recently favoured me by my friend, Mr. Dunlap, I find that Dr. Johnson, of Perth Amboy, is chronologically to be ranked among the pioneers of this class of naturalists. His letters bear date exactly a century ago, and he says he thinks the information he imparts to his friend abroad will be found profitable to an inquirer of like facts, one Mr. Linnæus! The polar star which subsequently illumined the heavens, and has been hailed by all nations, had then, in its ascent, hardly appeared above the horizon. Soon after this early date, when the artificial system of the great Swede had been submitted for the adoption of the learned in his own country, we find it unfolded to the votaries of Flora, by the learned and accomplished Colden, on the banks of the Hudson.

I proffer these particulars, as examples of the zeal of our forefathers for a knowledge of natural science. In the meanwhile, individuals of consummate acquisition in this field of investigation from remote Europe visited our shores, traversed our forests, reaped the rewards of their enthusiasm, and transmitted to their respective homes the offsprings of our soil. Clayton and Kalm, Masson and the Michauxs, were of the number of these adventurous naturalists. The productions they chiefly sought were not so much objects of curiosity; but such as, transferred to their respective climates, might become of benefit to the arts and domestic and rural economy. Our surprise will therefore cease, when in Europe we behold the

occidental plane flourishing in the garden of Paris, and our maple appropriated to decorations of regal furniture. It is a delectation, unmixed and cordial, to contemplate the characters of these lovers of natural history: while nature continues her bounties, may their number never dwindle, nor their excellence deteriorate. Their memory is perennial. Clayton was a medical graduate of Oxford, of the strictest integrity, ever piously inclined, and was wont to say that he beheld the traces of infinite wisdom and contrivance in the humblest flower. His *Flora Virginica* is known to every botanist. Kalm, originally intended for the ecclesiastical profession, became a physician and professor at Abo. Fired with the zeal of his preceptor, Linnæus, he, when quite young, discovered many new plants. He was particularly anxious to explore the virtues of vegetable bodies, their uses in medicine and in the arts. It was through the recommendation of Linnæus that he was chosen to undertake his voyage to America. His many discoveries essentially enriched the species *plantarum*, of his great master. Masson, by education, was early disciplined for botanical expeditions. He visited the Cape of Good Hope, the Azores, Madeira, and many other remote parts. Disdaining pecuniary recompense, save the slenderest stipend, he appropriated every faculty of mind and body to enrich his native country with foreign plants, capable of being naturalized. His success was equal to his expectations. Some few of our older residents still remember him

while in New-York. Of the mildest temperament he was excelled by none in enthusiasm in his pursuits. It is refreshing to survey the character of Masson: more brilliant names have rendered his less dazzling. Plants and naturalists were his absorbing associations. *Similis similibus gaudet.*

The Michauxs, father and son, have so connected their labours, that they may be deemed almost as one. The ardour and success with which they prosecuted botanical investigation, have few parallels in science. Their names will be perpetuated so long as their favourite study is cherished. Seldom has royal or imperial bounty been bestowed with greater wisdom than that in behalf of the Michauxs.

These eminent men, it will be perceived, were but sojourners in the land; many others might be mentioned; but I am spared the necessity of being more copious in these notices, as our late president, Dr. Mitchill, has published some account of them in the Collections of the New-York Historical Society. I regret, however, that his sketches are too frequently the less valuable from their extreme brevity and occasional inaccuracy.

It is also impossible for us, on this occasion, to add much concerning our indigenous writers on American Botany, however meritorious they are. To the Bartrams, father and son, succeeded the Bartons, of Philadelphia; Bigelow, of Boston; and Elliot, of South Carolina, as most conspicuous by their respective publications. We may justly boast of several

Floras of different states; that of Pennsylvania, by Muhlenberg; the genera of North American plants, by Nuttall; the Flora of the Northern States, by Professor Torrey; the Flora of Eaton; the Flora Bostoniensis of Bigelow; the Flora Ludovica of Robins and Rafinesque, and the elaborate synopsis Fungorum of Schweinitz, who has treated as a master of the recondite mysteries of the cryptogamia. A list of the Plants indigenous to the state of New-York was published by Jacob Green, in 1814. A Catalogue of Plants growing spontaneously within thirty miles of the city of New-York, was given to the public by this Lyceum shortly after its organization. I ought to have mentioned elsewhere the paper of Professor Lewis C. Beck, on the geographical Botany of the United States, communicated to the Albany Institute, in 1828. Within a few weeks past, an admirable Compend of Botany has been favoured the student by our fellow member, Dr. Gray.

Were I to do justice to our subject, I should dwell upon the merits of many other accomplished naturalists, whose efforts extended botanical knowledge; and to him in particular who has been so suddenly summoned away from among us, who filled so large a space, who held so high a rank, and whose loss we all so deeply feel, my preceptor and my friend during a large portion of my existence. His education, his pursuits, his ample resources, and his liberal expenditures, were all subservient to the advancement of the several departments of science, and to those espe-

cially associated with medical philosophy and the kindred branches. It was natural that he who had so sedulously laid a broad foundation in medical learning, should become the ornament of medical practice, and the eloquent expositor of its soundest doctrines: that he who in early life had largely partaken of the solid instruction imparted by a Smith and a Curtis, among the greatest teachers, should be imbued with the spirit of the naturalist, and excel in the promotion of the sciences. Yes, Gentlemen; your society has honoured itself in the expression which it has employed on this melancholy occasion: "Resolved, That it is incumbent on this Society publicly to express their sense of the services rendered by their late distinguished associate, Dr. HOSACK, not only to their Institution, but to the cause of science in this country by his personal services, his munificent patronage, and the countenance and encouragement he has uniformly shown its votaries."

The humble individual whom you have chosen to commemorate in suitable terms the merits and labours of our late associate, hopes that ere long he may be enabled to execute, in part at least, this responsible task. It were easy for you to have selected talents and erudition of a higher order for the purpose; difficult, indeed, to have found one who would enter on the duty with feelings more faithfully consecrated to the undertaking.*

* The task is assigned to better hands. Since the delivery of this Discourse, the duties of Biographer of this eminent individual, have been en-

As the vegetable world comprehends a large portion of the most beautiful and important productions of nature, so, too, there is no science which requires on the part of him who profitably studies it, a larger variety of physical knowledge: to such a one the pursuit is enchanting. A patient and continuous effort is demanded, in order to become acquainted with the immense labours already achieved: a sound judgment to discriminate the phantoms of the imagination from well-sustained deductions and incontrovertible truths: viewed in this light, the study of plants becomes most instructive. I have adverted to the geographical distribution of plants; this comprehended, our researches touching the localities of vegetables, and thence the Floras of our own country or of particular sections, is of easier acquisition. De Candolle and Sprengel have given us a curious chapter on the best laws for our government in this sort of investigation. On a sure foundation it exerts an essential influence on the science of the cultivation of the garden and the field; on the rearing and preservation of the forest, and other occupations. The physiology of plants has absorbed the best minds, from the time of Malpighius and Grew to our own day: and the diseases to which they are vulnerable, have been shown in numerous cases, by Duhamel

trusted to one well known for his ardent admiration of his worth, talents, and long professional career. The extensive correspondence and manuscripts of Dr. Hosack were, immediately after his decease, assigned to the Rev. Henry W. Ducachet, M.D. D.D., now Rector of St. Stephen's Church, Philadelphia, whose abilities justify the highest expectations.

and Schabol, to be remarkably analagous to those we ourselves suffer. Nevertheless, how useful would prove the service, and how extensive the consequent reputation of that American, who having examined the discrepancies of Mayow and Ingenhouze, Priestley and Ellis, and fortified with the facts of recent science, should set forth the philosophy of vegetables, their anatomy and functions, their noxious and their sanative powers, free from the perplexities which at present embarrass us.

The longevity of trees has not been overlooked, though it has not been sought into with the measure of importance it solicits. Many naturalists have given tabular views of the ages attained by vegetable bodies, and the classical scholar knows that the ancients were not incurious on the subject. Our North American forest trees are the representatives of so many families of arborescent plants growing from a remote time unmolested, that the principles which have been applied to an investigation of the respective ages of vegetable life, might be here tested with a prospect of a better determination of their accuracy.

Every one is acquainted with the history of the venerable chesnut-tree of Mount Etna, described by Adanson; and with the cypress-tree of Mexico. To the olive, I believe, is attributed the greatest longevity. A thousand and more years have been assigned as the life of the oak. I have seen the yew reported as of some seven centuries growth, in vigorous foliage, in Yorkshire in England; and the orangery of

Francis the First flourishes at Versailles, with the beauty and fragrance it imparted during the reign of that gallant monarch. Nor when in Holland, could I be withheld from the temptation of taking a branch from the palm which Clusius planted at Leyden, in 1609, which Boerhaave watered, and which Haller has described, and at that time more than two centuries old. It is said that the chesnut-tree of our west, which flourished when Columbus first reached the new world, still possesses its wonted energies. I am not botanist enough to know whether our sycamore or plane tree is as tenacious of duration. Inquiries into the longevity of trees would lead to a more accurate knowledge of the best means for their growth and health, as well as of the causes of their decay. Like human bodies, they have within themselves inherent sources of destruction; and, unfortunately, like them, they may be assailed from without by foreign and pestilential agents. The recent successful experiments of Sir Henry Stewart of Edinburgh are calculated to increase our means of research on several matters connected with vegetable life, and we ought ere this to have settled the disputatious speculations to which the theory of Mr. Knight has given origin. I have elsewhere recorded the inquiries which Dr. Bostock of London has submitted on this subject.

In the multitude of works almost daily appearing, we have the pledge that our Flora will soon be rendered more satisfactory: with none does the obligation to do this work so positively rest as with Ameri-

can botanists ; and there is not a production from the most enlightened foreigner, if properly examined, that will not be found susceptible of improvement. I speak this not with censure, but while I make the declaration, am most ready to bear the testimony of gratitude for all they have done for us. The Oaks of Michaux, surpassing all other monographs on the products of our country, is acknowledged to be deficient in many species ; and the magnificent volume of the accomplished Lambert, on our Pines, is marred by errors which an intelligent backwoodsman might rectify. The late Simeon De Witt, in a brief paper in the Transactions of the Society for the Promotion of the Useful Arts, invited the attention of naturalists to the misnomers of some of the forest trees of the United States : a regard to his suggestions would prevent much misapprehension. In the *Sylva Americana* of D. J. Browne, a commendable solicitude has been had on this embarrassing neglect.

Six, I believe, was the number of the different species of *triticum* (wheat) stated by Linnæus. Botanists at present have increased the amount to twenty-two. If the wild wheat discovered in Oneida county, New-York, shall be found to be an indigenous, not an imported grain, and of spontaneous growth, we may justly boast of the *Triticum Americanum*. Clinton says it delights in a wet soil, which is not congenial to the common wheat: it presents not only a different aspect, but seems to have peculiar and characteristic qualities. Should these conjectures be verified, our state may

claim the birth-place of Ceres, as well as Sicily, where mythology has yielded to her the title of queen; and the goddess enjoys two special abodes—*our* fertile west, as well as her favourite Enna. A harvest, in more respects than one, awaits the decision of this question by the American naturalists.

The living owe to the illustrious dead a faithful record of their acts and virtues: if man's intellectuality be an emanation of the Deity, the principle of gratitude is of an equally exalted origin. Yet how imperfect and how scanty are our written memorials of the eminent individuals who have preceded us, and to whom we have been made debtors by their elucidations of the manifold beauties of creation, their contributions to natural science, and the additional powers they have thus given man.

This just reproach ought to be removed, and biographical memoirs of the distinguished naturalists who have adorned our country deserve to occupy a portion of our time, and to hold a conspicuous place in our printed annals. It is a duty which we ought no longer to dispense with. That eminently celebrated body, the Royal Society of London, did not disdain to perpetuate the trivial incidents of the life of John Tradescant, the humble gardener of Kew. Where are the laurels with which we have decorated the brows of the intrepid explorers of this new world, who, with a hardihood to which the European philosopher is a stranger, have brought the vast treasures of knowledge from the remotest regions to our closet

studies and fire-sides? Mr. Ord and Mr. Peabody have, indeed, with a noble feeling, done justice toward Wilson; the late Dr. Trevitt of the United States Navy, has given us many precious particulars of the unfortunate Dombey, the victim of botanical zeal, whose energies and actions surpass, in the romantic, the story of Robinson Crusoe.

The excellent Dr. Garden has found a congenial friend to perpetuate his worth in Sir James Edward Smith. Dr. Sewell of Washington city, has not forgotten our late fellow-labourer, the persecuted and too short-lived Godman; some record has been preserved of the entomologist, Thomas Say, and a tribute has been paid to an early promoter of mineralogy among us, the late Dr. Archibald Bruce. Nor has the first president of the Lyceum, Samuel L. Mitchill, been permitted to depart without some commemoration of his learning and devotion to natural science. We are, too, indebted to the generosity and friendship of one of our lately deceased associates, for a memoir of great importance on the public life of DeWitt Clinton; and in all that relates to that great undertaking which has rendered his name enduring among all people, the work of Dr. Hosack will long be consulted as the authentic source of important information. But Clinton deserves from some competent individual of our society that his investigations and contributions in American natural history, should be more widely known and analyzed. He studied, when not tram-

melled by public cares, with philosophical precision, the peculiarities of the physical constitution of our aborigines ; furnished us with important conjectures on the habits and characteristics of the *zizania aquatica*, or wild rice of the American lakes, wrote on birds and on fishes, and loved, with a naturalist's fondness, every department of physical science. He delighted to dwell upon every incident associated with the labours and services of naturalists ; from Hennipen to Kalm, every thing was familiar to him ; the great Swede was ever a topic of delight and the heroic achievements of Cuvier the theme of his admiration. So much did he, at a late period of his life, become enamoured of the genius and skill of the modern French school of naturalists, that there is reason to conclude he would have finally adopted the natural system of Jussieu in preference to the artificial method of Linnæus, and would have chosen the improved nomenclature of the Parisian savans rather than that of the English writers, whose works he had studied with deference, and to whose authority he had originally bowed with submission.

There is, moreover, an obligation of the severest nature enjoined, in particular upon us, to display to the broadest light of every intelligent beholder, the disinterested career of De Witt Clinton. He was not surpassed by any other individual whom it has been my happiness to know, in advancing knowledge for the general benefit ; all his studies were directed to the patriotic intent of adding to the resources of our pro-

ductive industry, and to swell the vastness of the empire state. And when we take a retrospective survey of that unhallowed act upon his reputation which the violence of party strife inflicted in our society proceedings at an early date of our existence, we are summoned with united effort to give to our successors the faithful portraiture of him whom we now revere as an associate, and whose intellect stamped its impress on the age in which he flourished. By a faithful biography, from the Lyceum only, can we expunge that ballot which refused him membership until the monitions of conscience hastened to reparation by a united suffrage in his behalf and the rescue of our own honour. It is a curious coincidence, that at the very time when individual malignity thus exercised its nefarious influence at home, testimonials of distinction from eminent foreign societies flowed in abundance upon Clinton in acknowledgment of his successful efforts in the extension of science in his native land.

Some few other eminent names might be added, of which we may boast imperfect notices. But are we not chargeable with supineness when no becoming accounts exist of the early trials and sufferings of Carver, who depended on the eleemosinary kindness of Sir Joseph Banks ; of the learning and labours of Cutler ; of the prodigious and successful efforts of the Bartrams ; of Catesby ; of Colden ; of the noble daring of Lewis ; of the researches of Bradbury ; of the contributions of the lamented McBride ; no memoir

of Pike, who to military ardour added a love of the natural sciences ; no record of Pursh, whose Flora of our country is the last and most ample of its kind ; of Andrew Ellicot, the philosopher, who with astronomical accuracy first explored the western wilderness and published results of cheering importance. No detailed account of Stephen Elliott, a genius of the first rank in botanical knowledge.

Nor ought we so long to have withheld our recorded homage of that eminent individual whom Portugal in her official wisdom lately commissioned as her resident minister with us ; the late Abbe Correa de Serra. That profound philosopher and erudite scholar embraced within his mental grasp the circle of knowledge, and in natural history was unquestionably unsurpassed. Those who were in personal communion with him, can never forget the luminous illustrations of his learning on almost every topic. His society advanced the pursuits of natural knowledge by the exemplary charms which he, its great proficient, possessed, while his sumptuous conversations proved a new stimulant to effort, and awaked fresh enthusiasm in the breast of its less ornate disciples.

I must terminate these imperfect notices of our benefactors with one other. It is indeed a transition, from the celebrated Abbe to Paul Sannier ; but Paul cannot be omitted. Originally of France, his early life was absorbed in practical horticulture, and as an experimenter in vegetable physiology, as one of the

subordinates at the Jardin des Plantes. Here he had instilled into him the principles of the *Ordines Naturales* by their author, Jussieu. Shortly after he was selected for his botanical attainments to accompany the elder Michaux to this country: he proved serviceable as collector. By regal means, Louis XVI, by whose patronage Michaux the elder was authorized to procure American productions, a plot of ground in New-Jersey was appropriated as a suitable garden for rearing and preserving plants and trees, mainly designed for the institutions in France.

In this sequestered place, Paul, with the exception of occasional excursions to this city, and to parts adjacent, passed the remainder of his days. Here he was visited by the younger Michaux, Pursh, Douglass, Bradbury, and other foreign naturalists, who reached our shores. Poor Wilson, the ornithologist, often found shelter within his humble dwelling from the lowering sky and the tempestuous storm, and often have I heard Michaux enlarge on the refreshing enjoyments of Paul's hospitality. Paul was a sort of Sir Oracle with them, and his responses were heeded by all who sought practical knowledge in natural history. Paul, I believe, may be estimated the first as to time, who without much pretension, inculcated among us the classification of Jussieu, and the arboriculturist may perhaps be now, for the first time, informed, that to him are we to assign the introduction, into this country, of the Lombardy poplar. Paul holds a place in the progress of botanical pursuits not unlike

that enjoyed so long by the late venerable Wm. Bartram, of the Kingess Botanical Garden ; though I should be reluctant to assign to him a place so conspicuous as that of our philosophical traveller. I see in my audience several naturalists who knew him personally better than myself. Let Michaux speak of the goodness of his heart and of his disinterested philanthropy :

The meanest flower that blooms, can give
Thoughts that do often lie too deep for tears.

Paul was so exclusive in his attention to his avocations, that hardly any other subject than trees and plants ever found entrance into his mind. To the day of his death he considered his little circumscribed residence as still the property of his royal master, and ignorant of the vicissitudes of political revolution reluctantly gave credence to the fact of the decapitation of his bountiful but unfortunate king. Paul now lies in the Hackensack church-yard : his tomb-stone recounts not half his excellence.

Assuredly the lives of men such as I have noticed, might be made profitable study for the rising generation: they furnish realities which far outshine the brightest imaginings, invigorate ardour for physical truth, and swell the amount of rational enjoyment by the greater diffusion of a knowledge of nature, and the means by which that knowledge is awarded. The various achievements of Henry R. Schoolcraft, give earnest of what individual effort may accomplish when prompted by such noble impulse.

I have thus, gentlemen, thrown together some few of the more prominent subjects which have presented themselves to the mind in my casual reflections on the objects of the association. Many other equally conspicuous, for obvious reasons, I am compelled to leave untouched. If what has fallen from me has in the smallest degree excited a deeper interest in the welfare of this Lyceum, and exhibited its pretensions to the countenance and support of the disciples of knowledge, I am satisfied.

In conclusion, I am constrained to add one or two other remarks. The more we reflect upon the several advantages which characterize New-York, the stronger will be our conviction that of all places in our land, that in which our lot is cast, enjoys a matchless superiority. Our location is of easy access at all times and to all people: our population is surpassed by none in enterprize and in resources: well digested laws and the principles of religious toleration give to each individual equal rights and secure equal immunities, and leave the mind to the fullest scope in the exercise of its intellectual prerogatives. Choice in every business of life is optional with every one, and the freedom of selection is only controlled by those circumstances which each may volunteer to combat. With an ample population of this character, it is only necessary that each should know his own good in order successfully to pursue it, whether it lies in the arts mechanical, or philosophical; whether in details subservient to the humble avocations of ex-

istence or in the prosecution of studies which lead to individual distinction or national renown. In a compact thus organized, the smallest intellect may find occupation and happiness ; the most capacious mind every thing which it desires to embrace. Hence the hope that this association will never be found without those aids and encouragements which emanate from a people enlightened with a becoming spirit of independence, and zealous of their individual importance.

But there are other peculiar circumstances to which I would fain allude in behalf of this Society. I know that from its first formation up to the present hour, it has been the cherished object of the enlightened members of the liberal professions ; the jurist, the theologian, and the physician, each has contributed to its valuable memoirs and to its rich cabinets ; each has aided it by those means, without which all efforts are nugatory, all hope vain. This fact declares volumes in behalf of that general position long ago advanced by classical authority, that cultivated minds, though of different callings, find a mutual pleasure in pursuits, whether remote or immediate, which liberalize the feelings, instruct the understanding, and dignify human nature. This truth is axiomatic, when we embrace within our view the natural sciences ; their vastness is extensive enough for the greatest capacity ; their variety adequate to every taste ; their inherent interest enough to arouse the energies of the most indifferent ; their value such only, as he who possesses can fully estimate ; such

only, as he who is without that knowledge must often most sadly feel.

But more fortunate still: with the countenance of those who are recognized as of the liberal professions strictly so called, this association has received the co-operation of other individuals whose liberality our records attest: we all are apprized that to the natural advantages which New-York possesses are superadded the artificial, resulting from the successful cultivation of the mechanical arts: hence our city may be denominated one vast workshop, and be regarded as the focus of countless avocations, blessed with adequate support and encouragement; different and diversified causes thus reacting, we can readily comprehend the sources of her wealth, her power, and her extent: the spirit of the arts depends upon freedom of action and a wholesome competition; and the mind itself of the artizan is liberalized by association and by what favours the avenues of trade. Hence we foster, with the broadest expansion of American feeling, the services of a Whitney, an Evans, an Eckford, and a Fulton: and if we fairly canvass the question, we shall betray no ignorance in saying that the strongest patrons of useful science are often found among individuals of the mechanical professions. This society gratefully admits this affirmation.

But I would allude to another class of men, who have given to New-York its most unequivocal title to distinction; who, in an unprecedented short period,

have converted a humble village into a magnificent city, unparalleled for its enterprize, its recuperative energies, and its mercantile relationships. I was gratified when in consulting our minutes, I found such generous benefactions from that quarter. It, however, corresponds with the opinion I long ago formed of the patronage which mercantile men are wont to bestow on objects of taste and utility. Myself and my brother practitioners are free to acknowledge that our best patients are affluent merchants. I would enlarge this eulogy: I am persuaded that the most efficient contributors to the support and progress of literary and scientific establishments, both abroad and at home, are of the mercantile profession. Witness, in natural knowledge, the individual instances of Rumphius, of Holland; Hollis, of England; and Gresham and Roscoe, of the same country; in confederation, the Hon. the East India Company, with Sir Wm. Jones, whose Transactions rank with the foremost in all Europe in the promotion of the natural history of Asia.

In speaking of commerce, an elegant classical writer of our country, Robert Walsh, has lately judiciously observed: "The pursuits of commerce lead to the cultivation of the arts of peace, and to habits of liberal and useful research. They tend to soften and refine the manners, and to promote the virtues of humanity. They enlarge the understanding, and fortify the moral qualities. They generate a spirit of tolerance, and form a solid character of clear, sa-

gacious sense, destructive to the frivolity and to the prejudices, without which despotism cannot exist." And of the salutary influence which commercial avocations exert on the political destinies of a people, the same eloquent writer further remarks: "No government purely arbitrary can be established, or long endure, in a country where commerce is tolerated, or protected, upon a large and liberal plan."*

Let me assure the gentlemen, members of that eminent rank in life, that nothing which they have contributed towards this Lyceum has been lost: let me urge them, so far as their onorous and responsible duties will permit, to associate with us in promoting intellectual pursuits. We need their further countenance and support to uphold the cause of science in the eyes of the public. For all that they may bestow upon us, they will receive in return a premium of higher estimation than times of the severest panic can command. Life's banquet with them will be enriched with pleasures flowing from the reflection that they have aided the cultivation of studies, which in an especial manner prepare the mind for the advancement of its own internal powers of happiness, and render it doubly capable of increasing that of others; studies which give a new sense for enjoyment to the possessor, relieve the wearisomeness of indispensable toil, and refresh the spirits in a thousand commendable ways. In fine, they will in after days luxuriate in the self-satisfaction of contributing to place on an

* *Didactics*, p. 91-2. vol. i.

unshaken basis, an Institution which, though originally the offspring of a few disciples of nature, is destined, with fostering care, to grow, with the spirit of the age, and shed an undying lustre on the Emporium of the Western world.

FINIS.

